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A REVIEW OF THE NORTH AMERICAN SPECIES OF *ATHYSANUS* (JASSIDAE.)

HERBERT OSBORN AND E. D. BALL.

The genus *Athysanus* Burm. is world wide in distribution and in many of the faunal areas is represented by a large number of species. Being one of the older Jassid genera it has like *Deltoccephalus* been made the abiding place of a very heterogeneous mass of material. One by one the more strikingly distinct forms have been taken out and placed in genera of their own, leaving as a residue species whose strongest bond of union is probably their lack of distinctive generic characters upon which to separate them. As has already been suggested this confusion has been greatly augmented by the use of "the second cross nervure" as a final test between this group and the *Deltoccephalinae*. With every addition to our knowledge this character loses in value as a correct test of the separation of these groups and is now only regarded as of limited application between different genera in each series.

Under such conditions it was found to be almost impossible to give any characters to the group that would apply to all the included species. An examination of a series from Europe showed that their fauna was even more complex than ours but that it would nearly all fall into the same groups and that most of the remaining species belonged to genera already set off in America.

In the present paper an attempt has been made to arrange the North American species still remaining in this genus in a series of groups sufficiently homogeneous in character to be defined and thus give a basis upon which to work in future studies on related genera. In the following out of this plan a few species were eliminated as more closely related to other genera and then it was found that the remainder could easily be arranged in four series

on definite structural characters. These characters seem to be of sufficient value to warrant subgeneric separation at least, and perhaps upon a comparative study of the related genera some of these groups may be found worthy of generic rank.

Under each species is given the reference to its original description and the original reference to any synonyms that have been published and references to any descriptive article published since the Van Duzee Catalog. The bibliography in that Catalog is so complete and accurate that it has not seemed necessary to repeat it here except in one or two cases where the synonymy has been changed.

Key to the Subgenera.

- A. Vertex transverse, much wider than long, margins parallel or the anterior but slightly in advance of the eyes. Anterior margin in profile obtusely rounding to front, Subg. *Athysanus* Burm.
- AA. Vertex not distinctly transverse, usually produced before the eyes. Anterior margin in profile meeting front in an angle or conically produced point.
 - B. Vertex distinctly wider than its middle length, much wider than the long diameter of an eye.
 - C. Vertex and front obtusely, conically pointed; vertex convex between the eyes; front somewhat inflated; markings on vertex in the form of transverse lines or absent. Subg. *Conosanus* nov.
 - CC. Vertex and front angled; the vertex flat with a definite margin; front very flat in both diameters. Anterior margin of vertex with four definite black spots or with two which extend below the margin onto front, Subg. *Commellus* nov.
 - BB. Vertex narrow, its basal width rarely equal to its middle length, often narrower than the long diameter of an eye. Species small. Subg. *Stirellus* nov.

SUBGENUS ATHYSANUS BURM.

Head broad and short, the vertex much wider than long, margins parallel or nearly so, rounding to front without a definite margin, front broad, the face very deep, but little inclined. Elytra usually rather long, compressed behind and giving a wedge-shaped appearance to the insect. Venation definite, simple, but one cross nerve between the sectors, the antepical cells usually parallel-margined.

Type *A. argentatus* Fab. (European) which closely resembles *magnus* O. B.

Key to the Subgenus.

- A. Size very large, width over $2\frac{1}{2}$ mm.; front narrowing regularly into clypeus without an angle, *magnus* Osb. and Ball.
- AA. Size smaller, less than 2 mm. in width, apex of front distinctly wider than clypeus, often twice as wide.
 - B. Ground color white or pale straw, at least no greenish tinge, anterior margin of vertex with black spots.
 - C. Short and stout, elytra short, nervures light, apical cells short; female ovipositor no longer than pygofers, *frigidus* Ball.

- CC. Longer and rather slender. Elytra long, nervures dark, apical cells long; ovipositor exerted, attenuate, *exitiosus* Uhl.
- BB. Ground color pale green; elytra distinctly green; vertex with transverse bands.
- C. Vertex slightly longer on middle than against eye; transverse band on vertex narrow and straight, *striolus* Fall.
- CC. Vertex margins strictly parallel; transverse band on vertex broader, parallel with the margins, *parallelus* Van D.

ATHYSANUS MAGNUS OSBORN AND BALL.

Athysanus magnus O. and B. Proc. Ia. Acad. Sc. IV p. 225; Pl. XXVI fig. 2. 1897.

Resembling the European *argentatus* but larger, much larger than any other of our species. Vertex parallel-margined, not advanced in front of the eyes. Ashy gray with a transverse white stripe across the vertex and another on the pronotum. Length ♀ 8.5mm, ♂ 7.5mm; width 3mm.

Vertex nearly four times wider than long, half the length of the pronotum; front broad, almost flat, triangularly narrowing from the antennae directly to the clypeus. Pronotum transverse, nearly parallel-margined. Elytra distinctly longer than the body, venation typical Athysanoid pattern, usually a cross nervure between the claval veins.

Color: ashy gray, pronotum darker with a transverse pale yellow band just back of the middle; vertex with a pale band; elytra with the nervures distinct, margined with light, the centers of the cells irrorate with brown, costal margin creamy yellow; face brownish irrorate.

Genitalia: female segment as long as the penultimate, posterior margin in four rounding lobes, the inner pair smaller and separated by a triangular notch; male valve obtusely triangular, plates nearly twice the length of the ultimate segment, four times that of the valve, roundly narrowing to the middle then triangularly produced.

Habitat: Minn., Ia., S. Dak., Neb., Kans., Wyo. and Colo.

This species is readily recognized by its large size. It is almost identical in structure with *argentatus* Fab. the type of the genus *Athysanus* and which must stand as the type of the typical sub-genus.

ATHYSANUS FRIGIDUS BALL. (Plate 16, fig. 1.)

Athysanus frigidus Ball, Ent. News. X, p. 172, 1899.

Short and stout with a short, swollen head and almost square front. Resembling *exitiosus* but much stouter. Color dirty white, four black spots on anterior margin of vertex and four more before them on the face. Length ♀ 4.5mm, ♂ 4mm; width 1.5mm.

Vertex over two and one-half times wider than long, half longer on middle than against eye, broadly rounding to the tumid front; front wider than long, the apex twice the width of the clypeus. Elytra broad, short, just covering the abdomen in female, slightly longer in the male, venation obscure, typical Athysanoid, apical cells scarcely longer than wide.

Color: vertex white, four large, shining, black spots on the anterior margin, the inner pair near the apex, the outer pair outside the ocelli, a pair

of minute, approximate points on disc and sometimes one on either side near the base. Pronotum pale straw-colored, four small spots back of the margin, the inner pair approximate; scutellum with a pair on the disc. Elytra with the nervures pale. Dark specimens may have brown stripes in the cells and along the claval sutures. Face pale, a pair of quadrate spots just beneath the inner pair on vertex, a smaller pair beneath the outer ones, a pair of oblique marks near the apex of front and the suture below them, black.

Genitalia: female segment twice the length of the penultimate, shallowly emarginate posteriorly with a broad, slightly bilobed median process, pygofer broad, equalling the ovipositor; male valve broad, obtusely rounding; plates broad at base, regularly narrowing to the slightly divergent points, one-half longer than the ultimate segment, three times the length of the valve.

Habitat: Colo.

ATHYSANUS EXITIOSUS, UHLER. (Plate 16, Fig. 2.)

Cicadula exitiosa Uhler, Amer. Entomol. III, p. 72, 1880.

Very variable in size and color; usually a pair of round, black spots inside and slightly below the ocelli and a pair of oblique dashes in the basal angles of the vertex. Readily recognized by the entirely hyaline elytra with dark nervures and the long, exserted ovipositor in the female. Length, ♀ 4.5 mm, ♂ 3.5-4 mm; width, 1.25 mm.

Vertex two-thirds the length of the pronotum, half as long as its basal width, rounding insensibly into the front; front wedge-shaped below the antennae; clypeus wedge-shaped, broadest above. Elytra longer than the abdomen in both sexes, slightly compressed before the flaring apex. Venation Athysanoid, the apical cells long and narrow, appendix broad, extending entirely around the end of the wing: entire apex of the elytra very frail and often wanting in old specimens, the appendix especially so.

Color: vertex pale, washed with orange, a pair of round, black spots just over the margin onto the front and a pair of oblique dashes in the basal angles, sometimes constricted in the middle, between their anterior extremities lies a brownish crescent, its anterior margin definite and parallel with the vertex margin. Pronotum cinereous with four black spots back of the anterior margin; scutellum with heavy, black triangles within the basal angles and a median, posteriorly divided, stripe sometimes broken up into dots. Elytra hyaline with a milky reflection, nervures narrow, dark. Face pale yellow; front with two black spots on margin above, and numerous dark arcs on disc. Pale specimens may have nearly all these spots wanting except the round ones on vertex margins and the triangles of the scutellum. Very dark specimens, including most of those from Mexico and the West Indies, have these markings very broad and often confluent and the elytra smoky iridescent. A variety from Hayti has the vertex creamy with a transverse band across the middle and the spots in front black in sharp contrast, the pronotum with four longitudinal stripes.

Genitalia: female segment twice the length of the penultimate, truncate behind; pygofer rather slender, ovipositor long, attenuately pointed,

extending beyond the pygofer the length of the ultimate segment; male valve equilaterally triangular; plates very narrow, long, acutely triangular, about three times the length of the valve, their apices divergent, clothed with stout hairs.

Habitat: Abundant everywhere from Md., Ohio, Ia., Colo. and Ariz. south to the West Indies and Mexico. The most abundant species of the genus throughout the southern states.

ATHYSANUS STRIOLUS, FALLÉN.

Cicada striola Fall. Acta, Holm, XXVII p. 31, 1806.

Athysanus striola Van D. Can. Ent. XXI p. 11, 1889; Catalog p. 303 (*Limotettix*.)

Athysanus striola Osb. and Ball, Dav. Acad. N. S. VII, p. 91; pl. V fig. 4, 1898.

Long and narrow, tapering posteriorly, resembling in form the genus *Idiocerus*; eyes wider than pronotum. Variable in size, usually smaller than *parallelus* which it closely resembles. Greenish with transverse black stripes on vertex and face. Length ♀ 4-5mm, ♂ 3.5-4mm; width 1.25mm.

Vertex slightly longer on middle than against eye, twice wider than long, over half the length of the pronotum, rounding to the broad front; profile a trifle angled before the ocelli, other structures as in *parallelus*.

Color: pale green, vertex with a transverse black stripe as in *parallelus* but narrower, leaving a broader green stripe both behind and in front and strictly transverse, not parallel with margins. Face with the black sutures, arcs and the cordate upper margin of front, as in *parallelus*, very variable in breadth and intensity. Pronotum and elytra pale green.

Genitalia: female segment half longer than the penultimate, the entire posterior margin shallowly, roundly, emarginate; pygofer rather long, equaling the black ovipositor. Male valve broad, obtusely angular, plates about three times as long as the valve, triangular, their apices slightly divergent, much narrower than *parallelus*.

Habitat: (Europe) Ontario, N. Y., Ill., Iowa, Colo. and Vancouver's Isd. Doubtless will be found throughout the northern half of the United States and well up into Canada.

ATHYSANUS PARALLELUS VAN DUZEE.

Athysanus parallelus Van D. Can. Ent. XXIII, p. 169; Cat. p. 303 (*Limotettix*.)

Closely resembling *striolus* but larger and with a broader, shorter head. Pale green with a transverse band on vertex, facial sutures and arcs on front, black. Length, 6mm; width, 1.75mm.

Head with eyes wider than the pronotum; vertex strictly parallel-margined, two and one-half times wider than long, a trifle over half the length of the pronotum, roundly confused with the almost flat face; front broader than long, much broader than the clypeus at apex. Elytra long and narrow with a distinct appendix; venation typical Athysanoid pattern, apical cells long, curved.

Color: vertex pale yellow or greenish, a transverse black band just back of the ocelli, nearly as wide as the space behind it; face with the sutures, a line on the clypeus and the arcs on the front, black. The upper margin of

front is bounded by a cordate black line, the inner ends of the arcs are united by a pair of median longitudinal lines and there is a pair of black spots above the antennae. Pronotum pale green, the anterior margin darkened along the suture. Elytra pale greenish subhyaline, the nervures slightly lighter.

Genitalia : female segment twice the length of the penultimate, posterior margin truncate, the lateral angles rounding, a triangular, median notch nearly to the middle ; pygofer long, fairly stout, as long as the ovipositor. Margins of the notch, the ovipositor and short hairs on the pygofer black. Male valve as broad as the ultimate segment and about as long, obtusely triangular ; plates stout, a little over twice as long as the valve, and entirely concealing the pygofer, triangularly narrowing to the broad, roundly divergent apices. Entire surface thickly set with short, dark hairs.

Habitat : Ontario, Iowa and Colo.

Readily separated from *striolus* by the larger size, shape of the vertex and genitalia.

SUBGENUS CONOSANUS NOV.

Head equaling the pronotum in width ; vertex broad, transversely convex, bluntly angulate before, angulate with the front, the margin obtusely rounding or the whole front and vertex united to form a bluntly pointed cone. Front somewhat inflated, broad above, regularly narrowing to a parallel margined clypeus. Elytra variable, sometimes shorter than abdomen in female, sometimes longer in both sexes, always inclined to be flaring posteriorly, giving a parallel margined effect to the whole insect. Venation variable, the second cross nervure often present in the species with short wings. Those with long elytra have the central anteapical cell produced posteriorly and enlarged at the apex.

Type of the subgenus *obsoletus* Kirschb. Common to Europe and America.

Key to the Subgenus.

- A. Species stout, elytra usually shorter than or only slightly exceeding the abdomen, almost truncate at the apex, the central and anteapical cell rarely constricted and not extending posteriorly beyond the adjacent cells as far as its width at middle. Color pale straw, fuscous or black.
- B. Straw colored ; stout, resembling *obsoletus*, or fuscous with a broad light spot on the cross nervure (*varus*).
- C. Vertex distinctly angled, twice as long on middle as at eye, as long as the pronotum.
- D. Vertex with a straight, light line between the ocelli, separating two small triangular spots on apex from two broad obscure ones on disc. Lower corners of male pygofer extending as long, style-like points, much longer than plates. *extrusus* Van D.
- DD. Vertex with a pair of transverse bands broken forwards in the middle, male pygofer with the lower corners acutely produced but not extending beyond the plates. *alpinus* Ball.

- CC. Vertex more rounding, distinctly less than twice as long on middle as against eye, shorter than pronotum.
- D. Vertex unmarked, or with round spots; front broadest at base; elytra shorter than the abdomen in the female, the cross nervure not broadened.
obsoletus Kirsch.
- DD. Vertex with transverse bands, front bounded above by a cordate line, narrow, the margins parallel half its length; elytra long and narrow, the cross nervure in a broad white spot.
varus Ball.
- BB. Black, smaller and narrower, rarely dark brownish fuscous with light nervures but no broad light spot on the cross nervure.
- C. Vertex distinctly angular, the margins straight, nearly twice as long on middle as against eye; a yellow band at base of vertex and usually the nervures yellow.
plutonius Uhl.
- CC. Vertex rounding, but slightly conically pointed, but little longer on middle than at eye. Shining black, elytra coriaceous.
anthracinus Van D.
- AA. Species smaller and usually more elongate. Elytra usually longer than abdomen, rounding posteriorly, the central anteapical cell constricted in the middle, its apex produced as far beyond the adjacent cells as its middle width. Color brownish or fulvous.
- B. Elytra distinctly longer than body, form long and narrow. Females over four mm. in length.
- C. Pale testaceous, the vertex fulvous; face and below including legs pale testaceous.
symphoricarpe Ball.
- CC. Testaceous brown or brownish, transverse fuscous marking on vertex and pronotum; face and below fuscous or black, the legs partly lighter.
- D. Elytra pale, testaceous or cinereous, the nervures narrowly light, sometimes narrowly margined with fuscous, anterior and middle legs with the tibiae and the tips of the femora orange, rest of femora shining black.
vaccinii Van D.
- DD. Elytra with nervures almost white, the cross nervures broadly light. All nervures broadly, heavily fuscous margined, leaving only small stripes or spots of light in the center of the cells; anterior and middle femora and usually tibiae with alternate light and dark rings.
striatulus Fall.
- BB. Elytra only equaling the body in length, or slightly longer in the males. Form short and stout; species smaller, less than 4mm in length.
- C. Vertex with a definite transverse band between the anterior margins of the eyes; species over 3 mm in length. Front broad, distinctly wedge-shaped.
arctostaphyli Ball.
- CC. Vertex with markings very faint, no transverse band between anterior portion of eyes. Species 3mm or less in length. Front narrow, almost parallel margined.
dentatus O. and B.

ATHYSANUS EXTRUSUS VAN DUZEE.

Athysanus extrusus Van D. Can. Ent. XXV, p. 283, 1893.

Athysanus extrusus Osb. and Ball. Proc. Dav. Acad., N. S. VII, p. 92, Pl. VI, Fig. 1, 1896.

Larger and stouter built than *obsoletus* and with a longer vertex. Dirty straw-yellow, washed and marked with fuscous, usually four triangular, dark spots on vertex. Length, ♀ 5.2 mm., ♂ 4.2 mm.; width 2 mm.

Vertex slightly obtusely angled, twice as long on middle as against the eye, as long as the pronotum, posterior margin nearly straight, transversely convex, acutely angled with front, the anterior margin blunt. Front wider at base than its median length, rounding below to the clypeus. Elytra broad, broadly rounding, almost truncate behind, exposing the pygofer and last abdominal segment in the brachypterous female; reaching just to the tip of the plates in the macropterous male, exposing the two style-like processes. Venation distinct, typical *Athysanoid* or not infrequently with a second cross nervure between the sectors and a few irregular ones on clavus; apical and anteapical cells broad and short, central anteapical with the margins nearly parallel.

Color: vertex pale yellow, a light line between the ocelli and another along the margin to the apex on each side, forming a triangle which encloses a pair of triangular, dark spots. Back of this triangle are two broad, slightly irregular spots and another pair occupy the basal angles. Elytra with the nervures light, distinct, more or less margined with fuscous. Face pale, the sutures dark; tips of the lorae, a pair of lines on the clypeus and about nine arcs on the front, black.

Genitalia: female segment nearly twice the length of the preceding, truncate on its middle half, the lateral angles acutely triangularly produced, usually clasping around pygofer; male valve obtusely triangular, equaling the ultimate segment in length and nearly in width; plates as wide as the segment, roundly divergent to the parallel lateral margins, three times the length of valve, pygofer compressed beneath the plates, their style-like tips extending beyond them the length of the plates.

Habitat: Canada, N. Y., N. H., Conn., Mich., Iowa, Kans. and Colo. The very distinct genitalia of either sex will readily separate this species.

ATHYSANUS ALPINUS BALL.

Athysanus alpinus Ball. Ent. News. X, p. 173. 1899.

Resembling *obsoletus* in size and color, with the long vertex of *extrusus*. Straw yellow marked with fuscous, two transverse bands on vertex, angled forward in the middle. Length, ♀ 5.5 mm., ♂ 4.5 m.; width 2 mm.

Vertex as long as the pronotum, slightly obtusely angled, the margins rounding, front as in *extrusus*, the clypeus slightly narrowed towards the apex. Elytra reaching the middle of the last abdominal segment in the female, slightly longer than the abdomen in the male; venation rather weak and irregular, *Athysanoid*, the anteapical cells parallel margined.

Color: vertex pale straw, a transverse, black band arising just back of the ocelli, its anterior margin angling forward nearly parallel with vertex margin, its posterior margin rounding and paralleled by another less definite band on the disc, usually a pair of irregular spots in the basal angles. Pronotum pale, sometimes with four irregular, longitudinal stripes which do not reach the anterior margin. Elytra pale yellow, with the nervures light, some fuscous blotches, especially in the apical cells in the male. Face pale,

about seven broad arcs on front omitting both basal and apical margins, the antennal sockets and sometimes a spot on margins of lorae fuscous.

Genitalia : female segment half longer than the penultimate, the lateral angles rounded, the median third emarginate with a stout median process tipped with two divergent teeth, male valve as broad as the ultimate segment and about half as long ; plates triangular, slightly narrower than the valve, three times as long, together convex, their margins slightly concave ; pygofers compressed beneath the plates, the posterior angles triangularly produced, curved upwards, not extending beyond the plates.

Habitat : Mountains of Colorado.

ATHYSANUS OBSOLETUS KIRSCHBAUM.

Athysanus obsoletus Kirschb. Die Athysanus Arten v. Wiesb., p. 7, 1858.

Athysanus obsoletus Prov. Pet. Faune Ent. Can. III, p. 281, 1889.

Athysanus obsoletus Van D. Bull. Buff. Soc. Nat. Sc. V, No. IV, p. 199, 1894.

Athysanus relativus Gill. and Baker. Hemip. Colo., Bull. 31, 1895.

Smaller and paler than *extrusus*, with a blunter vertex. Vertex shorter than pronotum, rounding in front. Pale straw-yellow, sometimes with a pair of dark spots on vertex. Length, 4.5-5 mm.; width, 2 mm.

Vertex rounding, half longer on middle than against eyes, two-thirds the length of the pronotum, broadly rounding to the front. Front broad above, roundly narrowing to the clypeus. Elytra broad, exposing the pygofers and the ultimate segment in the female, distinctly longer than the abdomen in the male ; venation Athysanoid, slightly variable, apical cells minute in female, of medium size in male. The specimens from Van Couver's Island have the elytra still shorter in the female and only as long as the abdomen in the male.

Color : pale straw yellow, often unmarked above, sometimes with a pair of dark spots on the disc of the vertex, and some of the cells on the elytra fuscous heightened along the margins of the light nervures ; sutures of face and arcs of front sometimes broadly fuscous.

Genitalia : female segment half longer than penultimate posterior margin roundly or slightly angularly emarginate one-third its depth, its apex with a small, pointed tooth ; male valve small, weak, triangular, one-third the length of the ultimate segment ; plates three times the length of the valve, roundly narrowing to the broad, blunt apex, together bluntly spoon-shaped, the margin fringed with weak spines.

Habitat : (Europe), Ontario, N. Y., Iowa, Colo. and Vancouver's Isd. Doubtless occurs throughout the northern half of the United States and well up into Canada.

ATHYSANUS VARUS BALL.

Athysanus varus Ball. Can. Ent. XXXIII, p. 5, 1901.

More slender than *obsoletus*, with the elytra long and narrow ; much smaller and darker than *extrusus*, with the cross nervures broadly tinged with light. Straw colored, clouded with fuscous. Vertex with transverse bands. Elytra dark, with the nervures light, cross nervures broadly so. Length, ♀ 5 mm., ♂ 4.25 mm.; width, 1.5 mm.

Vertex sloping, scarcely two-thirds the length of the pronotum, half longer on middle than against eye, front narrower above than in *obsoletus*, nearly parallel-margined until just before the broad apex, clypeus parallel-margined. Elytra longer than abdomen in both sexes, narrow and without an appendix. Venation distinct, often the cross nervure is double and other irregular cross nervures appear in the clavus.

Color: Female; vertex straw yellow, a transverse band just back of ocelli, an interrupted band either side of this. Face pale, sutures, a large spot on clypeus, arcs on the front and a cordate line at its base, black or fuscous. Pronotum variably irrorate with fuscous, usually a submarginal row of black spots. Elytra with nervures light, the cells irregularly fuscous, the cross nervures thickened and broadly white. Male much darker than the female, the apex of front, lorae and all but the base of clypeus, black. Elytra with the cells nearly black, the white nervures in sharp contrast.

Genitalia: female segment one-half longer than penultimate, posterior margin nearly truncate, median third slightly produced; male valve nearly semicircular; plates long, triangular, three times the length of the valve, side margins slightly emarginate.

Habitat: Colorado (plains).

ATHYSANUS PLUTONIUS, UHLER. (Plate 16, Fig. 3.)

Jassus plutonius Uhler. Bull. U. S. Geol. Surv. III, p. 470, 1877.

Athysanus plutonius Prov. Pet. Faune Ent. Can. III, p. 282, 1889.

Much smaller and narrower than *obsoletus* and its allies. Similar to *anthracinus*, but slightly larger and lighter colored and with a more pointed vertex. Vertex distinctly, obtusely, angular. Elytra as long as the body, almost truncate behind, without an appendix. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1.5 mm.

Vertex twice wider than long, nearly twice longer on middle than against eye, slightly obtusely angular, the margins straight; pronotum rather long, half longer than the vertex. Elytra broad, rounding or almost truncate posteriorly, as long or slightly longer than the body. Venation typical, the central anteapical cell scarcely narrowed, apical ones broad and short, rarely much longer than wide.

Color: black, usually with a line on the base of the vertex, with a point extending forward on each side, a pair of oblique spots against the eyes, a few spots on pronotum, a pair of irregular stripes on scutellum and the nervures of elytra, yellow. Sometimes there is also a transverse band on disc of vertex, an angled one against the tip, fine irrorations over the entire pronotum and the centers of the cells as well as the nerves yellow. Usually in the males and sometimes also in the females all the yellow markings are wanting and the insect is of a shining black, except the basal line of vertex. Face black, the arcs on front and sometimes other markings, yellow. Legs black, the anterior and middle pairs abruptly yellow from just before the apex of femora, spines on hind tibiae, yellow.

Genitalia: female segment but little longer than penultimate, the middle half roundly produced, the lateral angles produced and subacute; male:

valve stout, rounding, half the length of the ultimate segment; plates roundly triangular, their apices slightly acute, two and one-half times as long as the valve.

Habitat: Ontario, N. H., N. Y., Iowa, S. Dak., Neb., Kans., Colo. and Texas.

ATHYSANUS ANTHRACINUS VAN DUZEE.

Athysanus anthracinus Van D. Can. Ent, XXVI, p. 136, 1894.

Form and structure of *plutonius*, but with the vertex shorter, rounding. Color black, shiny, first two pairs of tibiae, yellow. Length, ♀ 4. mm., ♂ 3.5 mm.; width, 1.5 mm.

Vertex very broadly, obtusely conical, but little longer on middle than against eye, margin confused with front, slightly over twice wider than long. Pronotum broadly rounding in front, much less enclosed by the head than in *plutonius*. Elytra as in *plutonius*, slightly exceeding the abdomen, flaring at the tips. Front rounding, distant from eyes above, rounding to the straight clypeus from below the antennae.

Color: shining black, the ocelli, two spots on the hind margin of vertex and traces of a few arcs on front, yellow. Legs black, the anterior and middle pairs yellow from just before the apex of femora.

Genitalia: female segment as in *plutonius*, sometimes nearly truncate, with the lateral angles blunter; male valve nearly semicircular, over half the length of the ultimate segment; plates roundly triangular, with the apices blunt, but little over twice the length of the valve.

Habitat: D. C., Iowa, Kans. and Colo. This and the preceding species are closely allied and can only be accurately separated by the shape of the vertex, which in *plutonius* is much more pointed and together with the eyes encloses more than half of the pronotum, while in *anthracinus* the vertex is blunter and the eyes are broader and shorter. The latter species is always black, however, while most of the specimens of *plutonius* show more or less of yellow.

ATHYSANUS SYMPHORICARPAE BALL. (Plate 16, Fig. 4.)

Athysanus symphoricarphae Ball. Can. Ent., XXXIII, p. 5, 1901.

Longer and narrower than *plutonius*. Form of *striatulus*, but larger, broader. Pale testaceous inclined to reddish on vertex. Length, 4.5 mm.; width, 1.25 mm.

Vertex broadly rounding, with a blunt, conical apex. Elytra much longer than body, with a narrow but distinct appendix, venation as in *striatulus*, the two branches of the first sector again touching before the short, outer anteapical cell, central anteapical cell long, constricted in the middle.

Color: pale testaceous, vertex distinctly reddish in most specimens, ocelli blood red. Elytra pale subhyaline testaceous or with a slight olive tinge, nervures narrowly pale, the cross nervures slightly wider. Front pale testaceous, with traces of fuscous arcs. Legs and below, pale orange testaceous.

Some specimens have olive and fuscous markings on pronotum and traces of fuscous margins on some of the nervures.

Genitalia : female segment little longer than the penultimate, the lateral margins slightly narrowing, the lateral angles slightly produced, the posterior margin either entire and very slightly produced in the middle or truncate and sharply notched either side of the middle.

Habitat : Six specimens, all females, have been taken in Colo. Four from Ridgeway on the west side of the Continental Divide, and two from Fort Collins on the east slope.

ATHYSANUS VACCINII VAN DUZEE.

Athysanus striatulus Fall (?) (or *vaccinii* nov) Van Duzee. Ent. Amer., VI, p. 134, 1890.

Athysanus striatulus Osb. and Ball. Proc. Dav. Acad. N. Sc., VII, p. 91, Pl. V, Fig. 3, 1898.

Form and size of *striatulus*, but lighter colored. Smaller and narrower than *symphoricarpæ*, which it approaches in color. Olive testaceous, darker below ; the tips of the anterior and middle femora and all of the tibiae, orange. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1 mm.

Vertex sloping, little longer on middle than against eye, twice wider than long. Pronotum much more produced anteriorly than in *symphoricarpæ*. Elytra long, appressed behind, sometimes a trifle flaring at the tip, venation as in *symphoricarpæ*, the central anteapical cells long and narrow, enlarged at the apex, which is produced beyond the adjoining cells.

Color : pale testaceous washed with olive, vertex with three transverse fuscous bands, the anterior one broken forward in the middle, the posterior one often reduced to two spots. Pronotum and scutellum with irregular, scattered fuscous spots, the latter with fulvous triangles in the basal angles. Elytra pale testaceous, subhyaline, the nervures slightly lighter, often narrowly fuscous-margined. Face and below black, sutures and arcs on front light. Basal two-thirds of femora black, apices and tibiae orange yellow.

Genitalia : female segment slightly longer than penultimate, the apical margins produced on middle third and again at the lateral angles, which are slightly acute ; male valve rounding, almost semicircular ; plates triangular, a little over twice the length of the valve, black, their margins clothed with long, yellow hairs.

Habitat : N. J., Md., Iowa, Kans. and Colo. Readily separated from the following species by the color of the legs alone. For an explanation of the synonymy see remarks under that species.

ATHYSANUS STRIATULUS, FALLEN.

Cicada striatula Fall. Hem. Suec., II, p. 45, 1826.

Athysanus instabilis Van Duzee. Can. Ent., XXV, p. 284, 1893.

Size and form of the preceding species, but darker and lacking the tawny tinge, legs dark, femora twice annulate with pale. Length, ♀ 4.5 mm., ♂ 4 mm.; width, 1 mm.

Vertex a trifle more pointed than in *vaccinii*, distinctly more conical than in *symphoricarpæ*. Elytral venation as in the latter species, sometimes a second cross nervure between the sectors as in *osborni*.

Color : vertex pale yellow with three transverse fuscous bands as in *arctostaphyli*, the posterior one broken forward on each side until it touches the middle one, its median limb forming a crescent, the median line broadly fuscous connecting the crescent with the band in front. In dark specimens these bands become confluent and the yellow reduced to elongate spots between them. Pronotum thickly and irregularly marked with fuscous omitting an elongate spot on the anterior margin. Scutellum dark, usually the margins, a spot on apex, and a pair of elongate tri-lobed ones on disc, pale yellow, Elytra light the inner apical cells smoky, nervures milky white, the cross nervures very broadly so, nervures broadly, heavily margined with fuscous. In dark specimens often filling up all but a small milk white spot in the center of each cell. Face light with the sutures, arcs on front and a spot on apex of clypeus, black ; or black with small spots in the middle of the facial pieces and narrow arcs light. Below dark, anterior and middle femora with two pale yellow bands.

Genitalia : resembling *vaccinii*, female segment slightly less arcuate, its lateral margins and the pygofer pale yellow ; male valve rounding, plates triangular, a spot on each side of the disc and stout hairs on the margin, yellow.

Habitat : (Europe) N. Y., Mich. and Colo. Doubtless widely distributed in a northern range.

Specimens of *striatulus* from Europe (Dr. Melichar) agree with our specimens in every respect, except that in them the central anteapical cell is often divided while in our material this is rarely the case. The fact that this is variable in both series, however, proves it of no value.

This and the preceding species, while unquestionably distinct, are still closely related and it is little wonder that Van Duzee confused the two forms. He first found *vaccinii* and described it as *striatulus* ? at the same time suggesting *vaccinii* for it if it proved to be distinct, then later finding the real *striatulus*, but as he regarded the other as being *striatulus*, this he named *instabilis*.

Besides the more definite black and white appearance of the elytra in this species, the two pale bands on the anterior femora will most readily separate it from *vaccinii*.

ATHYSANUS ARCTOSTAPHYLI BALL. (Plate 16, fig. 5.)

Athysanus arctostaphyli Ball. Ent. News, p. 173, 1899.

Resembling *vaccinii* and *striatulus* in form and color pattern. Shorter and stouter with a more angular vertex. General color deep, testaceous brown. Length, ♀ nearly 4mm, ♂ 3.5mm ; width 1.25mm.

Vertex slightly obtusely angulate, the apex produced, conical, twice wider than long, over half longer on middle than against eye, three-fourths the length of the pronotum. Front broad, convex in both diameters, wedge-shaped, narrowing directly to the parallel-margined clypeus. Elytra broad and short, usually flaring in the female, venation as in the three preceding species the apical cells shorter and the central anteapical not as strongly constricted.

Color : vertex tawny yellow, a line between the fulvous ocelli broken forward in the middle, a transverse band between the anterior portion of the eyes and a spot in each basal angle usually connected by a bracket-shaped mark hung from the middle of the band in front, fuscous. Pronotum irregularly fuscous marked, usually a fairly definite band of spots on the anterior submargin. Elytral nervures pale testaceous, margined with fuscous, the cross nervures broader and lighter. Face with the sutures, arcs on front and a spot on apex of clypeus fuscous. Below dark ; legs dark or sometimes annulate with pale.

Genitalia : female segment half longer than the penultimate, posterior margin weakly produced in the middle and at the lateral angles ; male valve semicircular, plates triangular, two and one-half times as long as the valve, the margins with coarse hairs.

Habitat : mountains of Colorado and Mt. Washington, N. H. This and the three preceding species form a little group of closely related forms in which the genitalia are of little value. In fact, this and the five preceding species are much alike in genital characters and it is only on the shape of the head, elytra and color pattern that they are readily separated. The shorter and more compact form, longer head and deep chestnut color will readily distinguish this species.

ATHYSANUS DENTATUS OSB. AND BALL. (Plate 17, fig. 5.)

Athysanus dentatus Osb and Ball. Proc. Dav. Acad. Nat. Sci. VII, p. 95. 1898.

Smaller and lighter colored than *arctostaphyli*, which it somewhat resembles. Pale testaceous, faint lines or spots on front margin of vertex and a wavy line on the disc forming an X-shaped figure. Length, 3mm ; width, 1 mm or less.

Vertex narrow, but little wider than long, roundly angled before, nearly flat, the apex but very slightly conically produced. Face narrow, but almost parallel-margined. Elytra about as long as the body, inclined to be flaring, venation often indistinct, as in *arctostaphyli*, the central anteapical cell not as strongly constricted.

Color : vertex pale yellow, six indistinct spots on the anterior margin sometimes united into an irregular broken line ; the posterior disc with a median pale X-shaped figure and a pale spot on either side at the base, the whole margined with a continuous brown line. Pronotum brownish or olive, the anterior margin yellowish, set off by a row of fuscous spots of which the median pair are the most distinct. Scutellum dirty yellow with a pair of brown spots on disc in line with those on pronotum and vertex. Elytra pale testaceous subhyaline, the nervures slightly lighter, sometimes a cross nervure on clavus and the one between the sectors are distinctly lighter and set off by a fuscous spot. Front testaceous with short, light arcs and a light spot below, rest of face pale yellow with sutures and spots on the apices of lorae and clypeus brownish fuscous.

Genitalia : female segment abruptly narrowed one-third the distance from the base, exposing a pair of light colored membranes, the lateral angles of

segment produced into long, blunt tipped, slightly divergent teeth, between these teeth the margin is produced into two small, rounding lobes separated by a slight notch. Male valve very large, triangular, the apex slightly produced, plates much enlarged, broad at base where they are convex, extending beyond the valve about half its length without narrowing, their truncate tips standing nearly perpendicular to the plane of the valve and together with the short pygofer forming an enclosed cavity.

Habitat : Colorado.

SUBGENUS COMMELLUS NOV.

Head as wide as the pronotum ; vertex angled before, flat or nearly so, angled with front and with a definite margin, not in the form of a conical point ; front broad, nearly flat in both diameters, margins straight and narrowing directly to the clypeus. Elytra in two forms, slightly shorter than the abdomen and inclined to be flaring, or long and parallel-margined ; venation irregular, often obscured by longitudinal stripes. Sometimes the inner fork of first sector not forking again or only at extreme apex, forming a small, triangular cell ; sometimes forking as usual and the second cross nervure present.

Type of the subgenus *A. comma* Van Duzee, no European representative known.

Key to the Subgenus.

- A. Ocelli and frontal suture distant from the eye-suture, several times the width of the ocelli ; spots on anterior margin of vertex extending down equally onto front and visible from below.
- B. Two pair of spots common to vertex and front ; stripes on pronotum black. Elytra with the venation obscured by brown stripes ; but one anteapical cell.
 - C. Four separate stripes on each elytron ; anteapical cells wanting or a single minute one, *comma* Van D.
 - CC. Eight separate oblique stripes on each elytron ; one large anteapical cell, *colon* O. and B.
- BB. A single pair of spots common to vertex and front. Pronotal stripes irregular, brownish ; venation distinct, nervures light, two or three anteapical cells, *sexvittatus* Van D.
- AA. Front above the antennae approximating the eye. Ocelli scarcely their own width from the eye-sutures (not the color line). Spots on vertex back of the margin, not visible from below.
 - B. Vertex margin sharp ; a pair of longitudinal, red stripes across vertex, pronotum and scutellum. Venation obscured by oblique, red stripes, *texanus* Osb. and Ball.
 - BB. Vertex with the margin blunt ; no red stripes ; venation distinct two cross nervures between sectors, a divided central anteapical cell.
 - C. Straw-colored, spots on vertex small, in a row between the ocelli. Front and clypeus without apparent suture, *osborni* Van D.
 - CC. Greenish yellow, spots on vertex large, the apical pair in front of the others ; front inflated, with a distinct suture below, *simplarius* nov. nom.

ATHYSANUS COMMA VAN DUZEE. (Plate 17, Fig. 1.)

Athysanus comma Van D. Can. Ent., XXIV, p. 114, 1892.

Athysanus comma Osborn and Ball. Ia. Acad. Sc., IV, p. 223, 1897.

Form broad and stout; vertex flat, roundingly right-angled, the anterior margin thick. Elytra long and parallel-margined or short and flaring. Color creamy white, four spots on the anterior margin of vertex, two at the base and four stripes on pronotum, black. Elytra with a fulvous brown band inside the broad, light margins on each side. Length, ♀ 5 mm, ♂ 4 mm.; width, 2 mm.

Vertex flat, anterior angle a trifle obtuse, anterior margin thick, nearly twice wider than long, three-fourths the length of the pronotum; profile acutely angled; front and clypeus almost straight; front moderately broad above, distant from eyes, scarcely convex, lateral margins almost straight to clypeus. Elytra longer than abdomen, parallel-margined, venation usually obscure except near apex, the inner fork of first sector not forking again or only to form a minute cell, apical cells large.

Color: pale creamy, four quadrate spots shared equally by face and vertex, a pair of round ones on base of vertex and four parallel stripes on pronotum and scutellum, black. Elytra pale with the claval suture, a band just before the apex and a line on the inner branch of first sector, black; a broad, fulvous, brown band extends around within the margins, broadest behind, its inner limb is divided anteriorly to connect with the stripes on pronotum. Face and below pale, a pair of quadrate spots below the antennae, another pair below the lateral margins of pronotum and a stripe on outer half of the connexivum, black. Legs pale, narrow, dark stripes on anterior sides of all the femora and a pair of broader ones on the inner margin of the posterior tibiae.

Brachypterous form, elytra shorter than abdomen, obliquely truncate, flaring behind, the apical cells reduced to mere rudiments almost in line with the apex of clavus. Color pattern the same except that the transverse bands at the apex are narrower. The last two abdominal segments have four longitudinal, black stripes, and the pygofers have on each side a round, black spot which is connected anteriorly with a stripe forming a comma. The males have another pair of black spots on the lower corners of the pygofers.

Genitalia: female segment a little longer than penultimate; the posterior margin roundingly emarginate, with a narrow, black-margined, median slit, the lateral angles inclined to be produced; a rounding or bilobed membrane at the apex of emargination. Pygofers short and stout; male valve large, triangular, apex rounding, sides indented, plates slightly wider than valve at base, narrowing to the middle, then parallel-margined to the nearly truncate apices, twice the length of the valve, equaling the pygofers.

Habitat: It has been found in Iowa, Neb., Kans. and in Colorado as far west as the mountains, and also in the mountains of New Hampshire.

ATHYSANUS COLON OSB. AND BALL. (Plate 17, Fig. 2.)

Athysanus colon Osb. and Ball. Proc. Ia. Acad. Sc., IV, p. 223, Pl. XXVI, Fig. 3, 1897.

Form and general appearance of *comma*, but with the inner fork of the first sector again forking to form an anteapical cell. Color pattern similar, but the bands on the elytra broken up into seven or eight stripes, and often a pair of black spots on the middle of the vertex. Length, ♀ 5 mm., ♂ 4.25 mm.; width, 2 mm.

Vertex slightly shorter than that of *comma*, face and profile similar; elytra similar except that the inner branch of the first sector forks again near the middle, forming a long, wedge-shaped cell, broadest behind where it touches three or four apical cells.

Color: clear, creamy white, with black spots and stripes as in *comma*, an additional pair of smaller spots on the disc of the vertex in line with the basal and apical pairs. Elytra with eight fulvous brown stripes as follows: a complete longitudinal stripe just outside the first sector and another next the claval suture, a narrow stripe between the branches of the first sector, a shorter one between the branches of its inner fork, a broadly interrupted one between the first and second sectors, a complete median stripe on the clavus, one on the outer apical half and another on the inner basal half. The apical cells and the apices of the anteapical fuscous margined.

Brachypterous form, elytra shorter than the abdomen, obliquely truncate, flaring, the apical cells minute or partly wanting; tergum and pygofer marked as in *comma*.

Genitalia: female segment slightly more emarginate than in *comma*, exposing more of the membrane beneath; male valve slightly broader, plates with the outer angles strictly rectangular.

Habitat: Only known from Iowa and Minnesota, where it is common. Readily separated from *comma* by the color and venation of the elytra. In all other points they are almost identical.

ATHYSANUS SEXVITTATUS VAN DUZEE. (Plate 17, Fig. 3.)

Athysanus sexvittatus Van Duzee. Can. Ent., XXVI, p. 93, 1894.

Resembling *comma* and *colon* in form and structure. Smaller and with longer vertex, resembling *extrusus* in color and elytral venation. Vertex flat, right-angled in front, a pair of black spots near the apex and two pairs of quadrate, brown spots behind them. Length, ♀ 4.5 mm., ♂ 3.5 mm.; width, 1.75 mm.

Brachypterous form, vertex flat, the anterior margin thick, slightly wider than long, as long as the pronotum. Profile acutely angled, the face nearly straight; front as in *comma*, distant from the eye at the base. Elytra short, obliquely truncate, exposing the pygofer, the last segment and part of the next in the female; rounding, exposing the pygofer and part of the last segment in the male. Venation distinct, irregular, two and sometimes more cross nervures between the sectors, the outer anteapical cell often minute or wanting, in which case the venation approaches that of *colon*.

Color : dirty straw, marked with rusty brown and olive ; vertex with a shining black spot either side at the apex, extending equally on to the front, a pair of small, round spots midway to the ocelli just back of the margin and two pairs of widely separated, quadrate, rusty brown spots on the disc. Pronotum with six more or less irregular, brownish stripes ; scutellum with a pair of large spots at base and a pair of dots on disc. Elytra with the nervures broadly pale, narrowly margined with rusty brown in irregular bands ; usually a rather distinct, oblique one from before the middle of clavus to the outer apical margin. Abdomen above with four longitudinal stripes emphasized on their margins ; pygofers with a pair of black spots, larger in the male. Face pale, the sutures dark-lined and distinct, front irrorate or lined with olive fuscous ; legs pale, anterior and middle femora twice annulate, posterior femora lined with brown.

Genitalia : female segment similar to *colon*, twice as long as the penultimate, the lateral angles acute, posterior margin slightly, angularly emarginate, the disc elevated so as to appear still more deeply notched. This emargination discloses a pointed lobe of another membrane which nearly equals the lateral angles ; pygofers short and stout ; male genitalia as in *comma* and in *colon*.

Habitat : Colorado, where it is fairly common, locally, in the short-winged form. No long-winged specimens have been found.

ATHYSANUS TEXANUS OSB. AND BALL.

Athysanus texanus Osb. and Ball. Proc. Dav. Acad. Nat. Sc., VII. p. 92. 1898.

Form elongate, parallel-margined ; vertex flat, less angled than in *comma*, anterior margin sharp. Color pale yellow, a pair of broad, parallel, red stripes extending from the anterior margin of vertex across the scutellum and three pairs of oblique ones on the elytra ; face dark. Length, ♀ 5 mm. ; width, 1.75 mm.

Vertex flat, but a trifle longer on middle than at eye, narrower than in *comma*, a transverse depression just before the sharp anterior margin ; face in profile sharply angled with vertex, in one broad, slight curve to apex of clypeus ; front moderately broad, its margin at base approaching the eye, gradually narrowing to the straight clypeus, but slightly transversely convex. Pronotum strongly produced anteriorly between the eyes. Elytra long and narrow, venation distinct towards apex, somewhat similar to *colon* in pattern, the outer anteapical cell closed, long and curved, central anteapical long, constricted, sometimes divided.

Color : pale yellow above, a narrow line on anterior margin of vertex, a small spot either side of the tip, a curved mark on the costal margin of elytra behind the middle, a spot on second apical and the posterior margin of the central anteapical cell, black ; two broad stripes parallel across vertex, pronotum and scutellum and three pairs on the elytra parallel with the claval suture, the inner pair continuous with those from the scutellum, bright red. Face dark brown, shining.

Genitalia : female segment one-third longer than penultimate, with the lateral margin suddenly narrowed from near the base, then roundly produced, the posterior margin with three faint lobes, produced part of nearly equal length and breadth. From under the emarginate side of the segment appears the acutely produced lateral angles of another membrane.

Habitat : Females from Texas and La. The male is, as yet, unknown.

ATHYSANUS OSBORNI VAN DUZEE. (Plate 17, Fig. 4.)

Deltocephalus osborni Van D. Trans. Am. Ent. Soc., XIX. p. 304. 1892.

Bright straw yellow, sometimes tawny, four black spots back of the vertex margin. Size of *obsoletus*, but with a flatter vertex and more flaring elytra, venation Deltocephaloid, the central anteapical cell divided. Larger and lighter colored than *sexvittatus*. Length, ♀ 5.5 mm., ♂ 5 mm.; width, 2 mm.

Vertex flat, a trifle rounded on the margin next to eye, obtusely, roundly angled, over two-thirds the length of the pronotum. Face nearly flat; front broad above, approaching the eyes, rounding below to the straight clypeus, without a visible suture. Pronotum with the lateral margins very short, the humeral ones long and straight. Elytra long, narrow, flaring, two cross nervures between the sectors, three anteapical cells, the central one divided, often other cross nervures present, especially on the clavus.

Color : straw yellow, washed with golden or tawny; vertex with four black spots just back of the anterior margin, the inner pair the larger; five pale lines on pronotum. Elytra with the nervures milk white, sometimes slightly and interruptedly fuscous-lined. Face pale, front with pale olive arcs, sutures around lorae, fuscous; femora twice annulate with fuscous, tibiae spotted.

Genitalia : female segment scarcely as long as the penultimate, lateral margins abruptly narrowed from near the base, exposing a rounding lobe of the membrane beneath, posterior margin of the narrowed segment roundly emarginate, with a blunt median tooth, pygofer rather narrow; male valve very small, transverse; plates triangular, their tips acute, slightly longer than the ultimate segment.

Habitat : N. Y., Ind., Iowa, Neb. and Colorado. Only the long-winged form is known.

ATHYSANUS SIMPLARIUS NOV. NOM.

Deltocephalus simplex Van Duzee. Trans. Am. Ent. Soc., XIX. p. 304. 1892.

Stout, head large, form cylindrical. Venation and genitalia as in *osborni*. Greenish yellow, sometimes quite green on the elytra. Vertex with four large, black spots back of the anterior margin. Length, 4.75 mm.; width, 1.75 mm.

Vertex large, sharply right-angled, as long as the pronotum, nearly twice as long on middle as against eye; front very broad above, almost touching the eyes, a little inflated, angularly narrowing from the antennae to the clypeus. Pronotum long, pushed forward between the eyes, posterior

margin straight, lateral margin very short. Elytra longer than abdomen in both sexes, almost parallel-margined; venation as in *osborni*, two cross nervures between the sectors and the central anteapical cell, divided.

Color: vertex straw yellow, slightly greenish cast, a pair of approximate, triangular spots just behind the apex and a large pair of oval ones inside and behind the ocelli. A line across the base of the apical spots would fall in front of the oval ones. Scutellum pale yellow, pronotum and elytra pale green, the nervures lighter. Front brownish, with pale arcs.

Genitalia: female segment a little longer than penultimate, suddenly narrowed from near the base, the lateral angles rounding, exposing the rounding angles of another membrane, posterior margin roundly emarginate, with a triangular median tooth; male valve transverse, very small; plates together, semicircular, with their apices produced, half longer than the ultimate segment, their margins fringed with coarse hairs.

Habitat: N. Y., Md. and N. J. Strikingly distinct from any other described species. The characters of this and the two preceding species are very puzzling and contradictory; in some points they appear closely related, in others not at all. They are not very closely related to the others in this group and are only placed here for convenience until their larval forms and life-histories are known.

The name *simplex* is preoccupied in this genus by *simplex* Sahlb., of Europe.

SUBGENUS STIRELLUS NOV.

Head about as wide as pronotum, vertex narrow, rarely as wide as the long diameter of an eye, usually longer than its basal width. Front inflated, almost touching eyes above; vertex and front produced into a long, conical point, their margins indistinct. Elytra narrow, about as long as the abdomen; venation as in *Athysanus*, regular; ovipositor long and narrow, extending beyond the elytra except in *curtisii*.

Type of subgenus *A. bicolor* Van Duzee.

Key to the Subgenus.

- A. Female ovipositor but little, if at all, exserted, rarely extending beyond elytra; face pale yellow with a fuscous "Y" resting on clypeus and its arms extending to the eyes, *curtisii* Fitch.
- AA. Female ovipositor long and narrow, extending beyond pygofers often one-fourth its length, usually extending beyond elytra; face without the "Y."
- B. Face with a transverse, white band below eyes, occupying all the lower half except the apex of clypeus. Anterior margin of pronotum and scutellum, black, *bicolor* Van Duzee.
- BB. Face unicolorous or with scattered fuscous markings; pronotum unicolorous or with a row of submarginal spots.
- C. Vertex right-angled, produced in front of eyes and conically pointed; four round, black spots in a square between the eyes, *obtusulus* Van Duzee.
- CC. Vertex obtusely rounding, extending but little in front of eyes, two large, black spots on anterior margin in female, male entirely dark, *mexicanus* n. sp.

ATHYSANUS CURTISII, FITCH.

Amblycephalus curtisii Fitch, Homop. N. Y. State Cab. p. 61, 1851.

Jassus nervatus Prov. Nat. Can. IV, p. 373, 1872.

Deltocephalus curtisii Prov. Pet. Faune Ent. Can. III, p. 278, 1889.

Athysanus curtisii Osb. and Ball. Proc. Ia. Acad. Sc. IV, p. 221, 1897--Proc. Dav. Acad. Nat. Sc. VII, p. 91, pl. V, fig. 1, 1898.

Short and stout, greenish yellow, two large round black spots on vertex. Elytra fuscous with the nervures green. Length 3.5mm, width 1.2mm.

Vertex but little broader than a right angle, nearly twice as long on middle as against eye; front very broad above, triangularly narrowing to the parallel clypeus. Elytra broad and short, appendix small; venation simple, slightly variable, central anteapical cell short, straight-margined.

Color: vertex pale yellow with two large round black spots before the middle; pronotum with the anterior half shiny black, the posterior half greenish yellow, sometimes narrowly margined with fuscous behind. Scutellum pale yellow, two fuscous points on the disc. Elytra fuscous, the margins and all the nervures before the apical cells greenish yellow; face pale yellow a branching spot on the apex, the margin of front below the eyes and a median stripe down the clypeus fuscous, the two latter unite to form a Y-shaped figure. Below fuscous.

Genitalia: female segment half longer than penultimate, the posterior margin slightly, roundly emarginate either side a small, rounding median lobe; male valve roundly triangular, as long as the ultimate segment; plates together equilaterally triangular, their apices acute, margins sparsely fringed with hair.

Habitat: Ontario Can., N. H., Vt., N. Y., Pa., Ohio, Mich. and Iowa. The color pattern is quite constant and very distinct in our fauna, making this one of the easiest species to accurately determine.

ATHYSANUS BICOLOR VAN DUZEE.

Athysanus bicolor Van D. Can. Ent. XXIV, p. 114, 1892.

Deltocephalus virgulatus Uhl. Proc. Zoo. Soc. Lon. p. 78, 1895.

Athysanus bicolor Osb. and Ball. Proc. Ia. Acad. Sci. IV, p. 222, 1897--Proc. Dav. Acad. Nat. Sc. VII, p. 91, pl. V, fig. 2, 1898.

Somewhat resembling *curtisii* the head narrower; female with two black spots on vertex and two stripes on elytra; male with the apex of vertex all black and the apex of elytra black with an oblique light dash. Length, ♀ 3.5mm, ♂ 3mm; width, 1mm.

Vertex about as long as its basal width, slightly acutely conical, not quite twice as long on middle as against eye; front inflated above, but little narrowing to the long clypeus; pronotum strongly rounding in front with more than half of its length included within the long narrow eyes. Elytra rather short and broad, rounding behind with a very feeble appendix; venation obscured, similar to *curtisii*.

Color: vertex pale yellow, a pair of round black spots on anterior half, rarely confluent in female, confluent and covering anterior half of vertex in

the male. Pronotum greenish yellow, a black band on anterior third, another narrower band margining the pronotum behind and covering about half of the scutellum. Elytra greenish yellow, the sutural margin, claval suture and apical margins narrowly fuscous in the female, a subhyaline area extends obliquely backwards from the costal margins. In the male, and sometimes in the female also, these markings are all much broader and there is a fuscous patch in front of the subhyaline area connected internally with the apical margin by two oblique fuscous lines. Face with upper half smoky in female, black in the male, the lower half pale yellow, sometimes a narrow black margin below in male. Sometimes females are found marked like the males throughout.

Genitalia: female segment the length of preceding, posterior margin straight or very slightly emarginate; pygofers rather long, constricted behind, and much exceeded by the slender ovipositor; male valve equilaterally triangular, not quite as long as the ultimate segment and one-third as wide; plates but little longer than the valve, together nearly semicircular, their margins clothed with long hairs which are slightly exceeded by the light margined pygofers.

Habitat: D. C., N. J., Md., Va., N. C., Fla., Ill., Iowa, Neb., Kans., Miss., Cuba, Hayti, St. Vincent, Vera Cruz, Mex., and Para, Brazil. This is a very widely distributed species and as is usually the case varies much in size and color in different localities. Specimens are at hand from Hayti that average much smaller and paler than ours and on the other hand specimens from Vera Cruz are very large and most of the females have the black marking of the male type.

ATHYSANUS OBTUTUS VAN DUZEE.

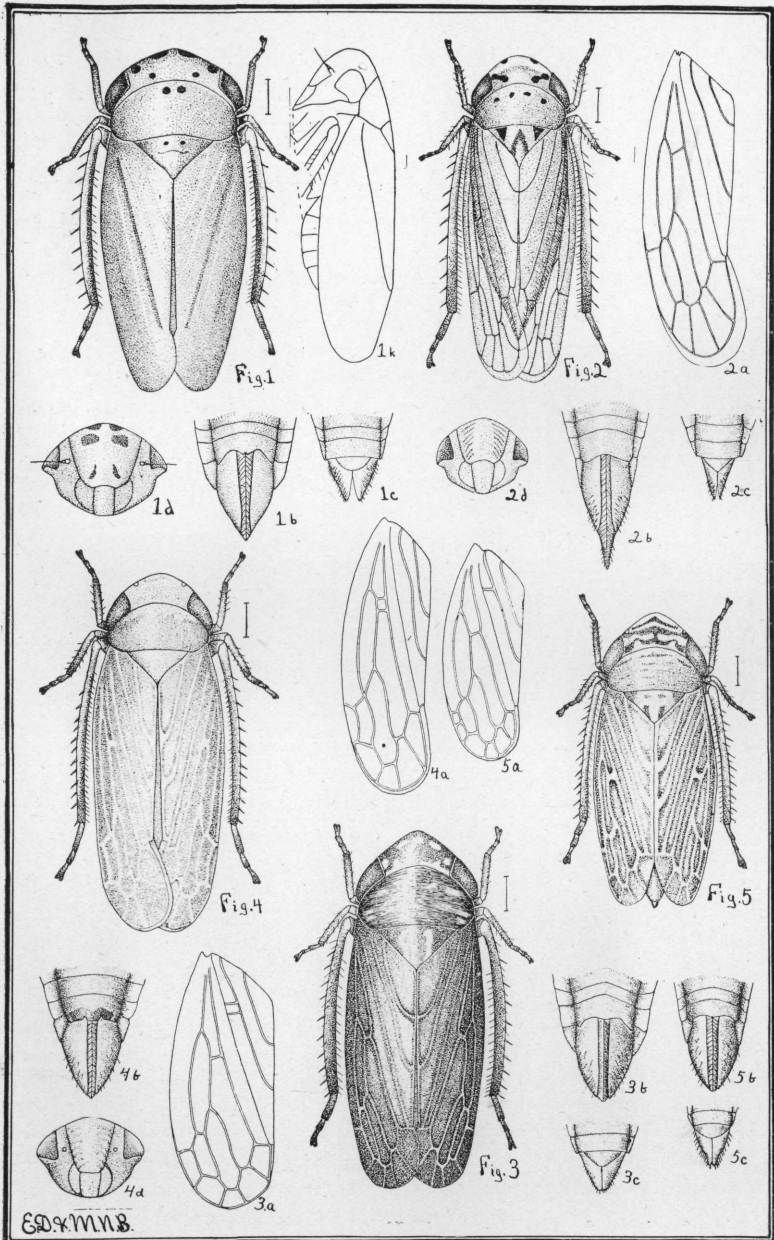
Athysanus obtutus Van Duzee. Can. Ent., XXIV, p. 115 and 156, 1892.

Athysanus obtutus Osb. and Ball. Proc. Ia. Acad. Sc., IV, p. 222, Pl. XXI, Fig. 2, 1897.

Size and form of *bicolor*; testaceous, four black spots on vertex, a submarginal row on pronotum and the apical veins black. Length, ♀ 3.5 mm., ♂ 3 mm.; width, 1 mm.

Vertex very slightly longer and narrower than in *bicolor*, distinctly longer than its basal width. Head with the eyes inclosing more than half of the pronotum. Elytra narrower than in *bicolor*, apex narrowly rounding, not reaching to the apex of the ovipositor in the female.

Color: vertex pale testaceous, a pair of round spots on a line with the anterior margin of eye and another smaller pair behind them. Pronotum testaceous, a row of irregular spots on the anterior submargin; scutellum with a pair of spots within the basal angles. Elytra testaceous, subhyaline towards the apex, with the nervures bounding the apical cells fuscous. Face testaceous, the apex of clypeus fuscous. Sometimes in pale specimens the fuscous spots are nearly all wanting, while in dark ones the anterior pair on vertex are much enlarged and the face may be darkened above.



Genitalia : female segment very short, scarcely as long as the penultimate, posterior margin truncate or very slightly emarginate ; pygofers as in *bicolor*, much exceeded by the oviduct ; male valve small, equilaterally triangular, but little exceeded by the bluntly rounding, bristle-margined plates.

Habitat : D. C., Md., Iowa, Kans., and Miss. This species and the preceding very closely resemble each other in structural characters ; *obtus* however has a narrower vertex and face and more sharply angled elytra. The color pattern is quite distinct and it is only very pale females of *bicolor* that could be confused with this species and even these may be separated by the lack of fuscous marking on the apical veinlets.

ATHYSANUS MEXICANUS N. SP.

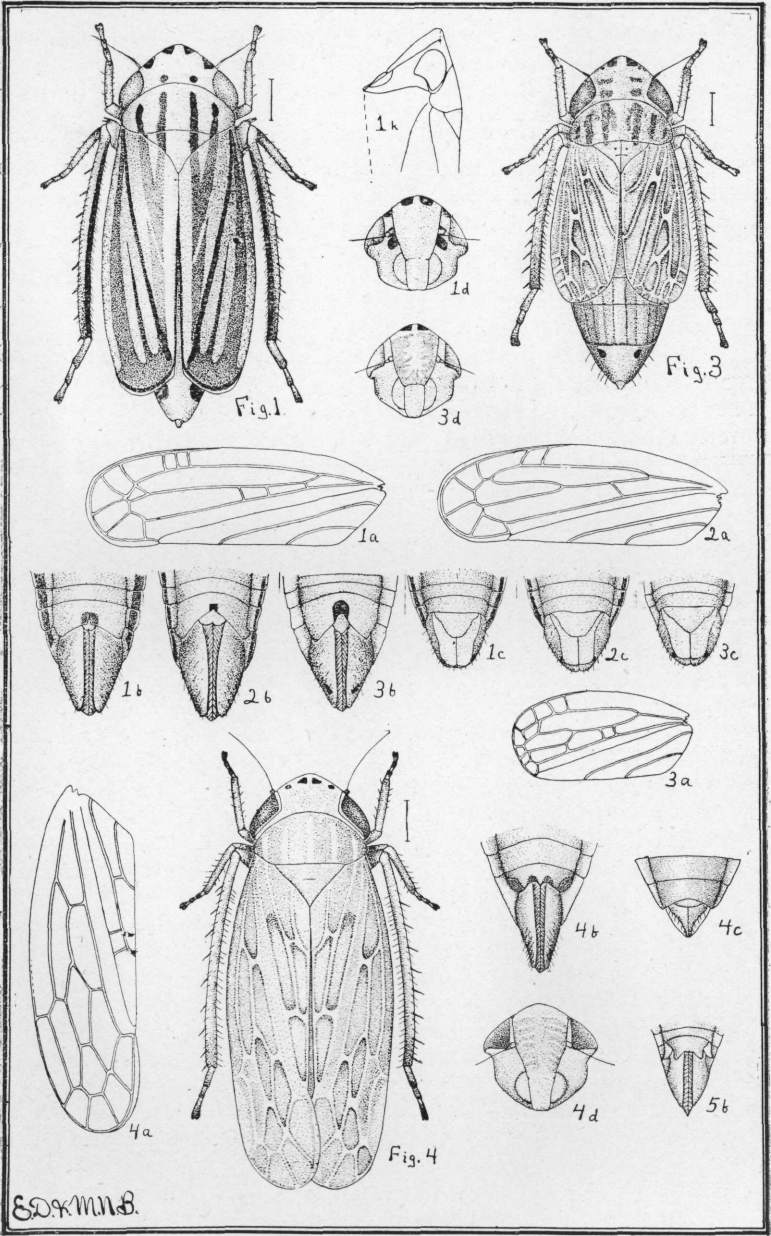
Form of *obtus* and *bicolor*, but with a blunter head and still longer ovipositor in the female. Color, female greenish or brownish, vertex yellow with two black spots on the anterior margin ; male all dusky brown or black. Length, ♀ 3.75 mm., ♂ 2.75 mm. ; width, 1 mm.

Vertex narrow, subquadrate, a trifle longer than its basal width, a fifth longer on middle than against eye, two-thirds as wide as the long diameter of eye, evenly rounding in front, the margin rounding to the face. Front narrow and almost parallel-margined until just before the apex, where it rounds off to the long, straight-margined clypeus. Elytra as in *bicolor*, not as long as the ovipositor in the female, the apical cells short.

Color : female, vertex pale yellow, a pair of large, quadrate, black spots occupying all of the anterior margin except a median line and a narrower one next eye, usually a much smaller pair near the base behind these. Pronotum greenish, or brownish with a few impressed fuscous spots in the middle of the anterior submargin. Elytra greenish subhyaline, brownish subhyaline with greenish nervures, or entirely smoky brownish ; ovipositor testaceous as seen from above. Face pale yellow, arcs on front, sutures and a spot on middle of clypeus fuscous. The upper pair of frontal arcs broad, spot-like, separated from each other by a line which is a continuation of the line on vertex, and from the spots on vertex by a line but little broader than the median one. Male, vertex with the spots like female, but so large that they are only separated by narrow lines or are confluent and uniformly fuscous, darker than the eyes ; pronotum brownish fuscous, shiny. Elytra brownish or fuscous, the apical margin and rarely the claval areas milky. Front black with yellow margins and very short, yellow arcs, rest of face brownish, light on genae.

Genitalia : female segment about half longer than penultimate, margins parallel, ovipositor very long and narrow, longer than in *bicolor* or *obtus*, exceeding the pygofers by more than the length of the segment ; male valve right angled, the apex acute ; plates roundly triangular, the apex rounding, over twice as long as the valve, submargins with a few, stout, white spines.

Described from numerous specimens from Orizaba, V. C. Mex. collected in Feb. 1892. (H. Osborn.)



SPECIES NOT INCLUDED.

Athysanus acuminatus Bak.

This species is only known by the single, faded, male type and while it without doubt belongs to the Subgenus *Conosanus* its character could not be made out with sufficient certainty to warrant including in the synopsis.

Athysanus ornatus Gill.

This species belongs to the genus *Driotura* O. and B. of which *A. gammaroides* is the type.

Athysanus artemisiae G. and B.

Both the specific value and generic position of this species are still in doubt. It does not belong to any of the groups enumerated above and probably should not be included in the genus at all.

Athysanus litigiousus Ball

This species was only doubtfully referred here in the original description and does not fall readily into any of the above groups. When more material can be studied it will probably be possible to refer it to another genus.

EXPLANATION OF PLATES.

PLATE 16.

- Fig. 1. *Athysanus frigidus* Ball.
b, female, genitalia; *c*, male, genitalia; *d*, face; *k*, side view.
- Fig. 2. *Athysanus exitiosus* Uhl.
a, elytron; *b*, female, genitalia; *c*, male, genitalia; *d*, face.
- Fig. 3. *Athysanus (Conosanus) plutonius* Uhl.
a, elytron; *b*, female, genitalia; *c*, male, genitalia.
- Fig. 4. *Athysanus (Conosanus) symphoricarphae* Ball.
a, elytron; *b*, female, genitalia; *d*, face.
- Fig. 5. *Athysanus (Conosanus) arctostaphyli* Ball.
a, elytron; *b*, female, genitalia; *c*, male, genitalia.

PLATE 17.

- Fig. 1. *Athysanus (Commellus) comma* Van D.
a, elytron; *b*, female, genitalia; *c*, male, genitalia; *d*, face; *k*, profile.
- Fig. 2. *a*, elytron; *b*, female, genitalia; *c*, male, genitalia of *Athysanus (Commellus) colon* Osb. and Ball.
- Fig. 3. *Athysanus (Commellus) sexvittatus* Van D.
a, elytron; *b*, female, genitalia; *c*, male, genitalia; *d*, face.
- Fig. 4. *Athysanus (Commellus) osborni* Van D.
a, elytron; *b*, female, genitalia; *c*, male, genitalia; *d*, face.
- Fig. 5. *b*, female, genitalia of *Athysanus (Conosanus) dentatus* Osb. and Ball.

The figures have been drawn by Mr. Ball and finished in ink by Mrs. Ball.